GrummanWorld

Volume 8, Number 22 | Our Employees Are Our Major Shareholders | November 27, 1989

Grumman Forecasts Healthy Overseas Sales

In the next few years, a large share of Grumman's sales growth will have a foreign accent.

Grumman's foreign sales subsidiary — Grumman International, Inc. — hosted its 1989 annual forum on November 6. During 1989, Grumman will ring up $887 million in international awards, almost double last year's total.

The future looks even brighter. Grumman International forecasts $1 billion dollars in business next year. It intends to pursue $10 billion worth of foreign business opportunities over the next five years, compared to $6 billion in new business domestically.

"The rapid growth of the Pacific Basin countries, increasing foreign takeovers of U.S. companies, and the coming unification of the European market in 1992 all force us to focus on the world as a marketplace," said Rolf Larson, Grumman International president.

International Affair. *Rolf Larson, president of Grumman International, told attendees at the subsidiary's recent annual forum that Grumman will post $887 million in foreign sales in 1989, double last year's total. (Photo by Rich Breunig)*

"By 1995, we aim to have 24 solid positions in the world, with active, on-going programs."

Grumman Chairman John O'Brien said the company has become much more aggressive in pursuing overseas opportunities. "When the A-6 was canceled, we immediately asked the Navy to let us try to sell it overseas," said O'Brien. "The foreign military sales office came back to us with bad news and good news. The bad news was that there wasn't much interest in the A-6. The good news was that the EA-6B could well be our newest international product."

The Department of Defense recently gave Grumman permission to brief Japan and South Korea on the EA-6B Prowler. If the EA-6B survives the current budget battle in Washington, D.C., it will enjoy healthy prospects for overseas sales. The House-Senate defense authorization bill provides for no new EA-6B's in fiscal 1990, although the appropriations committees look favorably on it.

"We need to keep new Prowlers in production if we're going to sell them overseas," said O'Brien.

Grumman hopes to make it as popular overseas as the E-2C Hawkeye, which has been bought by Japan, Singapore, Israel, and Egypt. The EA-6B is currently the only electronic warfare aircraft in production.

Furthermore, countries can buy the plane with no research-and-development funds, and it comes with a support network: Grumman, the Navy and the U.S. Marine Corps. Grumman plans to market the aircraft to the NATO countries, and to Japan, South Korea, and Australia.

Japan could buy up to 10 EA-6Bs in the mid-1990s. That number of aircraft would equal $600- to $700-million in sales for

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Budget Battle Update:

Senate OK's Fiscal '90 Defense Authorization Bill

On Wednesday, November 15, the Senate approved the 1990 defense authorization bill by a 91 to 8 vote. The bill was scheduled to go to President George Bush for his signature.

The bill calls for the purchase of 18 new F-14D's, but also closes the F-14 line after the last plane is delivered.

Meanwhile, the House approved its 1990 defense appropriations bill on November 15 and sent it to the Senate. That bill includes funds for 18 new F-14D's.

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Global Vision. *Grumman Chairman John O'Brien said the company has become more aggressive — and more creative — in its pursuit of overseas markets. (Photo by Rich Breunig)*

International Sales To Reach The $1 Billion Mark Next Year

(Continued from page 1)

Grumman.

Grumman also aims to sell $800 million in S-2T turbotrackers over the next three to four years. This antisubmarine warfare (ASW) aircraft was first developed by Grumman in the 1950s for the U.S. Navy; since then, Grumman has refurbished the planes for Argentina, Turkey, and other nations.

Besides Grumman's existing product line, the company is working with foreign customers to develop new products.

"Within the past couple of years, we've stopped seeing the foreign market as just another place to sell our existing products," said O'Brien. "We've gotten over the one-size-fits-all approach. We've become comfortable enough with our overseas customers to help them identify their requirements, and innovative enough to come up with the products to fill those needs.

"The idea of a joint venture with Chinese and European companies to build firefighting equipment in China would have intimidated us six or seven years ago," said O'Brien. "And it probably wouldn't have occurred to us to team with an Italian company in a competition to build Air Force trainers. Or to put a new engine into one of our old S-2s to satisfy another country's needs. Or to modernize older MiGs for the Chinese. Or to put the E-2C system into a C-130."

Grumman plans to propose a C-130 airborne early warning system for the U.S. Coast Guard, and market this capability to Australia and Malaysia as well.

With about $4.5 billion in potential business, the Pacific Basin represents Grumman's biggest opportunity for growth. These countries stretch from Australia to Southeast Asia to Japan.

A fresh new business venture in that region is Grumman-Singapore Computer Systems Private Limited, which opened this past summer. It will develop computer software, mainly for design and manufacturing. These products will help Singapore's industrial firms modernize; the joint venture will also introduce Grumman's systems-integration expertise to that part of the world.

In Europe, Grumman is preparing for the unified European market of 1992. This economic unity is the result of a free-trade treaty among most major Western European nations, which will go into effect that year.

Grumman is negotiating strategic business alliances with such European companies as Deutsche Aerospace, M.A.N., and Siemens of Germany; and Thomson S.A. and Dassault of France. Grumman wants to cooperate on technology development projects. These include: advanced aircraft surfaces, electronic sensors, and other products of benefit to both Grumman and its European partners.

"Nobody can predict with certainty what 1992 will bring, but one thing is clear: the European market will be much more cohesive," Larson said. "With that in mind, some might ask, why would the Europeans be interested in forming alliances with the U.S.? Well, some businesses there fear that if the U.S. is locked out there would be a backlash in America against Europe."

Grumman's number-one goal in Europe is to sell the Joint Surveillance Target Attack Radar System (Joint STARS) to North American Treaty Organization (NATO) allies. This system is now being developed for the U.S. Air Force and Army.

With that in mind, Grumman recently opened a new office at NATO headquarters in Brussels, Belgium. Next April, the Joint STARS aircraft will fly to Europe for a 30-day field demonstration for NATO senior commanders. Representatives of German, Norwegian, and Italian armed services will also be in attendance.

Grumman also hopes to sell the Integrated Family of Test Equipment (IFTE) in Europe. This family of computerized automatic testers includes a portable, briefcase-sized tester, a mobile field facility, and a base or factory workstation for software development.

"NATO countries want to be able to do their own maintenance on whatever weapons they buy," said Fred Raymes, vice president - Programs for Grumman International. "IFTE can be programmed to handle any weapon system."

Grumman's foreign sales mainstay, the E-2C Hawkeye, is still in the running for future markets. The French Navy is planning to purchase the E-2C: France's new aircraft carrier is designed to accommodate the aircraft. Grumman is also marketing the aircraft to Thailand, Indonesia, and South Korea.

While most of Grumman's foreign business opportunities are in the military arena, there are commercial ventures under way also. Versions of the Long Life Vehicle, which Grumman builds for the U.S. Postal Service, are now being test marketed in Saudi Arabia and Finland. These countries would use the vans for their postal delivery as well as telephone servicing.

EIP Office Announces Holiday Schedule

If you plan to make a lump sum contribution or change your deduction by the end of 1989, you must submit your requests to the Employee Investment Plan office no later than Monday, December 18.

Normally, the deadline for these two types of transactions is five working days before the end of the month. However, the company begins its year-end holiday break on Friday, December 22.

If you wish to make either transaction by the end of December, make sure you mail your lump-sum contribution or authorized deduction form early. They must reach the EIP office no later than December 18.

Those Grummanites whose total 1988 compensation was over $52,235 should note that they may not make lump sum contributions to their Investment Plan accounts. The Internal Revenue Service placed that restriction on the Grumman EIP earlier this year.

Obituaries

George W. Bauer of Methods, Milledgeville, Aircraft Systems Division, died Nov. 7 at the age of 60. He had been with the company since 1952 and resided at 1251 Dunlap Rd., Milledgeville, Georgia.

Patrick Duffy of EBW-Final Assembly, Bethpage, Aircraft Systems Division, died Oct. 22 at the age of 60. He had been with the company since 1974 and resided at 71 Sycamore Ave., Bethpage, N.Y.

John W. Baur of Instrumentation Test, Bethpage, Aircraft Systems Division, died Nov. 13 at the age of 61. He had been with the company since 1965 and resided at 25 Roosevelt Dr., Bethpage, N.Y.

Appointments

Aircraft Systems

Integrated Logistics Support: Walter Link, project manager, Program Controls, A-6.

Manufacturing Technology Operations: Warren Polidori, program manager, A-6.

Electronics Systems

Engineering Operations: Sheldon Schwartz, deputy director, Contract Manufacturing.

Data Systems

Information Services Operations: Alan MacKenzie, deputy to Daniel Larkin, vice president.

Grumman Delivers First C-17 Rudders, Ailerons

Grumman recently delivered the first rudders and elevators for the Air Force's next-generation C-17 transport plane.

McDonnell Douglas is a happy customer. "Grumman has been successful on the C-17 control surfaces program, due to the dedication to quality and responsiveness of the entire Grumman team," says Bob Klepper, vice president and general manager of the C-17 program for McDonnell Douglas.

The control surfaces were shipped by truck from Grumman's Stuart, Florida, facility, to the Douglas plant in Long Beach, California, and to LTV in Dallas, Texas. Grumman is also building ailerons for the C-17; the first set of these will be delivered later this month.

Once the C-17 program reaches full production — sometime in 1993 — Grumman will ship two and a half shipsets per month to McDonnell Douglas. The C-17 is scheduled to fly during the first half of 1991. Eventually, a fleet of 210 C-17s are planned for the Air Force.

The plane will have a maximum payload of 172,200 pounds and will have an even greater fuel capacity, enabling it to fly long distances without refueling. It will have a wing span of 165 feet, will measure 174 feet from nose to tail, and will stand 55 feet tall.

The C-17 will take equipment and troops to airfields near the front lines. "The C-17 offers the out-sized cargo-carrying capabilities of the current C-5 transport, but will be able to land on small, austere fields," says Don Schlegel, vice president - Aerostructures. "Now, the Air Force has to transfer cargo to the smaller C-131 to reach the outer lines, using transshipment bases."

In addition to the crew at Stuart, Grummanites in Bethpage and Melville, New York; and Milledgeville, Georgia, are involved in the C-17 program.

Each Grumman-built shipset of control surfaces contains 10 components: a pair of ailerons; a pair each of inboard and outboard elevators; and four rudders. The ailerons are on the trailing edge of the wings and control the rolling motion of the aircraft. The elevators and the rudders are parts of the tail section and control, respectively, pitch and yaw. These are big structures: the longest, the aileron, measures 21 feet.

This first delivery marks the end of a complex development program that began in May 1987.

On-Time Performance. *In Stuart, Florida, Bob Smith and Ray McCormick work on a rudder for the C-17 transport aircraft. Grumman recently began delivering shipsets of the C-17 control surfaces to McDonnell Douglas. (Photo by John Spades)*

One of the technical breakthroughs is the development of a co-cured, multi-rib stiffened, composite assembly.

The skins of the ailerons and the elevators are made of graphite epoxy laminated with a material called Syncore — a film of resin filled with hollow glass spheres. The skins are cured and bonded directly onto close-spaced ribs in a single autoclave process. This provides a low weight composite assembly with a greatly reduced fastener count.

"That reduces the mechanical assembly process and makes it go much quicker," says Nick Corvelli, the program director. "This technique also helped us design lighter weight structures."

The co-curing is performed in Milledgeville, Georgia, while the assembly is done in Stuart, Florida.

"The development program was also one of the first in the company to be done using task teaming," says Corvelli. In task teaming, all the disciplines — such as budgets, purchasing, and engineering — are grouped and work together throughout the development process. That way, each group knows the others' requirements from the very beginning — and misunderstandings get rectified quickly.

The development contract for the control surfaces is worth about $30 million, and the production phase of the contract could reach over $400 million. Funding for the program has strong support in both the House and Senate.

Besides the control surfaces program, Grummanites in Bethpage, Glen Arm, and Milledgeville are producing over 45,000 machined, sheet metal, and composite parts on the program.

Grummanites in Bethpage have also designed and built several major final assembly fixtures that have been installed at Douglas' huge assembly building in Long Beach, California.

Data Systems Institute Offers Computer Classes

Grumman Data Systems Institute will offer a variety of classes in computer technology in the following months. The subjects and start dates for the Woodbury, Long Island, campus are:

Day Classes	Start Date
Computer Service Technology	January 2
Electronic Technology	January 3
Computer Operations	January 8
Computer Programming	February 26
Computer Aided Design and Drafting	April 2

Night Classes	Start Date
Computer Service Technology	January 2
CADD	January 3
Computer Operations	January 10
Computer Programming	January 22
Electronic Technology	January 29

The Bohemia campus will offer a day class in Electronic Technology, beginning on January 8; a night class in the same subject, beginning January 15. A day class in accounting starting March 5; the night class starts February 12.

For more information, call (516) 364-2055 in Woodbury, and 467-6690 in Bohemia.

Cogeneration Plant Now Lighting Up Bethpage

Grumman will save over $4 million in energy costs over the next year, thanks to the gas cogeneration plant in Bethpage. The facility is now providing Bethpage with all its electrical power and heating.

Depending on the time and day, the facility turns out as much as 56 megawatts of power. It is owned and operated by TBG Cogen Partners, a joint venture of General Electric's Turbine Business Operations, Brooklyn Union Gas Company, and J. Makowski Associates. Grumman has no equity interest in the facility.

A ribbon-cutting ceremony will be held at the end of this month at the facility.

The cogeneration facility has two gas-fired turbines. It supplies Grumman with power at a rate lower than that charged by the Long Island Lighting Company (LILCO). Its opening is especially timely after the decision in June by New York State Governor Mario Cuomo and LILCO to decommission the Shoreham nuclear power plant.

As a result of that decision, LILCO was granted two rate hikes of five percent this year and yearly hikes of five percent for the next 10 years.

"We expect to save $80-90 million over the 15-year duration of the contract with TBG," says Art Gibson, staff assistant to the vice president-Product Integrity and Environmental Protection.

"We must hold costs down and keep Grumman competitive," says Gibson. "Over the past few years, sophisticated new manufacturing equipment and computers have been installed in Bethpage. That gives us more capability — but it means our energy requirements have gone up."

Grumman's peak usage this year was 42 megawatts, which occurred in July due to the surge in demand for air conditioning. Grumman's peak usage is usually in the upper-thirty-megawatts range. Grumman has first claim to the power; under contract, LILCO gets the excess.

"We still obtain 10 megawatts of low-cost power from the New York Power Authority," says Gibson. That power is generated upstate and has been transmitted to Grumman since 1983 as a result of an agreement between the company and the authority. With LILCO's permission, Grumman transferred the 10 megawatts to Calverton and Holtsville.

Gibson says the plant should consume about four billion cubic feet of gas per year. Even though it's designed to run on natural gas, it can use low-sulfur oil if there is ever an interruption in the supply.

"Furthermore, the facility is environmentally safe," says Gibson. "Natural gas burns very clean, and emission controls ensure the environment is protected. It operates quietly. Controls are also in place to minimize water use — most of the steam gets recirculated, such as through recondensation by air cooling rather than water cooling. Long Island is an ecologically sensitive place, so those are important factors."

Cogeneration projects benefit residential customers and other commercial users of electricity. The plant effectively adds 50 megawatts to LILCO's power grid. In addition to providing LILCO with lower-cost power, the utility will need to build fewer of its own generators. Both costs would be borne by the consumer.

Such projects also reduce the likelihood of summer "brownouts." During the past few summers, LILCO's generators operated at near-maximum efficiency. In order to prevent a total system blackout, LILCO must reduce power output to certain parts of its grid. Cogeneration plants take some of the load off LILCO's power generation system.

The Wattage Starts Here. *Jamie Elliott adjusts a steam turbine at the new cogeneration facility, which provides Grumman's Bethpage, Long Island, complex with all its electricity and heating. It is expected to save $4 million in its first year. (Photo by Ken Johnson)*

E-2C Keeps On Getting Better

Since the first generation E-2C Hawkeye went into service in the early '60s, regular upgrades and advances in technology have expanded its mission.

"The Hawkeye's first job was to provide airborne early warning for a carrier battle group," says Program Vice President Harvey Fromer. "Through the years, its mission has been expanded to include near- and over-land surveillance and target detection. That's required continuous updates to its avionic tracking system. Operating over land, airborne radar has to deal with a great deal of clutter that you don't encounter at sea. And the additional weight imposed by the upgrades have required structural and power plant improvements, too."

Recent enhancements, called Group I, have included more powerful and efficient engines, improved radar, and a higher speed computer to process radar information. Hawkeyes with these features have been in production since 1988.

Group II enhancements are now being developed and tested. These will further extend the E-2's radar and IFF (identification friend or foe) detection ranges and tracking capabilities. They will be phased into production late next year. Approximately six Navy Hawkeyes are being built each year.

"Group II upgrades will keep the Hawkeye up-to-date through the '90s," says John Stark, technical director for the Hawkeye.

The new APS-145 radar will extend the range of target detection approximately 100 nautical miles. It's better at over-land tracking and cutting through background clutter. For the first time, the E-2C will have over-land, all-weather tracking ability. More than 2,000 targets can be monitored simultaneously. "The APS-145 is a fully automatic radar system. It will give the operator more time to concentrate on the information being displayed," says Stark.

The main display unit is being improved, too. It will display target information in seven different colors, making it easier to discriminate between friend, foe or unknown.

"The display unit has both automatic and manual capabilities," says Stark. "A computer threat profile allows the system to automatically classify a target as a threat, but the operator can override the computer's decision and reclassify the target any way he sees fit."

The Group II upgrade allows the pilot and co-pilot to be connected to the information system for the first time. "The upgrade automates many aspects of the three-man mission specialist crew, but it also presents them with more information," says Stark. "Now, during periods of intense activity, the crew up front will be able to help the three specialists with navigation and communication tasks."

The Global Positioning System improves navigational accuracy by using satellites to check location. And the Joint Tactical Information Display System will provide secure and jam-proof communications between the E-2C and all U.S. forces including carriers, ships and shore commands.

Much of the the Group II upgrade work is being done in the E-2C systems integration and development lab in Building 14. Flight test data is evaluated on the ground; systems engineers can act quickly on the data and make necessary adjustments. This makes flight testing quicker and less expensive.

"The Group II upgrades are progressing well," says Fromer. "All test requirements have been met."

I Heard It At The Pin Meeting:

O'Brien Answers Questions On Pay, Planes And Property Plans

At a pin meeting on Friday, November 10, Grumman Chairman John O'Brien answered a number of questions:

Is it true that the EA-6B program is moving out to Calverton?

O'Brien: The EA-6B group is based in Melville and we don't have any plans to move it. We will be shifting groups of people around as we phase in the airport closing and phase out some of those buildings. The A-6 group has already moved to Calverton.

Is the A-6 program moving to Building 25?

O'Brien: No, they're not moving back to Bethpage.

Has there been any thought of putting people on flex time or having people do more work at home so we can cut down on office space and overhead?

O'Brien: There's been a lot of chatter back and forth on flex time, which I'm a proponent of. But the problem is that building our products requires so much coordination between different groups — and, in some cases, coordination with our customer.

We've got to be very creative with the Tomcat-21. We've got to do things we haven't been able to do before, and we've got to do it with a reasonable amount of money.

In addition to flex time, I'm a very strong proponent of a four-day week. That would dramatically drop our costs. However, our customers are open five days a week.

There are other factors to consider. For instance, what impact would it have on two income families? We're locked into a lot of things. But we haven't abandoned the idea; we'll continue to study it.

I don't really have to be here physically. I could be working on my computer at home.

O'Brien: I see opportunities to do that in selected areas. And I think over the next five years you will see us moving that way. You'll see industry moving that way. We've come a long way in the last couple of years. But the next steps are serious policy steps that have to be worked out very carefully.

What is the future of the EA-6B program?

O'Brien: The Navy still needs EA-6B's. The Senate and the House agree the Navy needs more of them. In the heat of the battle for the F-14, the Senate took out the EA-6. We can't do much about that. We think the EA-6 is solid enough that it will be funded. We're going to have to work quietly and struggle a little bit to get it. I'm convinced the EA-6B, if not funded in '90, will be funded in '91.

What is the future for the Tomcat-21?

O'Brien: The future's very bright — if we're able to convince the Navy to buy it. And more and more Navy studies say they need it. By 1993 we'll know whether an NATF is going to work, what it's going to cost and what a Tomcat-21 will do. We're already working with the Navy on the Tomcat-21.

We've got to be very creative with the Tomcat-21. We've got to do things we haven't been able to do before, and we've got to do it with a reasonable amount of money.

So we've got a tough road ahead of us. We've also got some tough political fights. But we're living in an entirely different world. One of the problems in Washington is that the U.S. doesn't have a dependable enemy anymore. It can't count on him to do nasty things around the world. What's going to happen when the European community gets together? Are the Europeans going to be rushing to buy United States-made defense systems? The Russians are trying to sell their airplanes. They make some pretty good airplanes now. We are going to be competing to sell our products against Russians. These are the arguments we face in Washington.

There are other enemies that are recognizable, such as the drug lords and terrorists. I think we should look into designing and making products that would be installed in airports, and other commercial products.

O'Brien: I don't think we should run in that direction, unless we can find somebody to go into a joint venture with us using our technology and their marketing capability. We look at those opportunities three or four times a week, because people are constantly coming in to us. But we haven't found one that fits yet.

I think we're better off sticking to what we know how to do. Because even though budgets are flat, large parts of that defense budget are rising very rapidly. All the data processing, all the systems analysis, all of that type of work is rising 15 percent a year.

Are we exploring any business possibilities with Boeing?

O'Brien: We are Boeing's top-rated supplier on the 767. We make the whole fuselage center section in Florida. We make some of the movable surfaces on the 757. We have a backlog of about 400,000 manufacturing hours of work in Building 3 and other manufacturing plants for parts. So we're very heavily involved with Boeing and we're looking at more Boeing work.

We're modifying Federal Express airplanes in St. Augustine, Florida, and we're looking to expand in the transportation market because Federal Express, United Parcel, and all those companies own hundreds and hundreds of planes. Somebody has to do their mod work and design work for them, so we're working our way very quietly into those marketplaces.

Can you bring us up to date on some of the real estate development activities going on?

O'Brien: We're starting the development of the Holtsville property next to our Data Systems building on the Long Island Expressway. We're continuing to work on the plans for developing the Bethpage airport. We signed a contract to build a hangar for our corporate airplanes at Republic Airport.

What's Going On? *Chairman John O'Brien answers questions posed by Grummanites at the last pin meeting. (Photo by Marie Trimborn)*

We're going to develop the 200 acres around the Bethpage runway. We're starting to brief the community on our plans. We've briefed the town of Oyster Bay. We've briefed the water districts of Hicksville, Hempstead and Bethpage.

It's just going to take a long time, because we want to lay it out very carefully. We want to watch the market. We want to entice some big customers to use that property and we want to bring the right developer in.

How come Grumman doesn't advertise as much as Lockheed, McDonnell Douglas, or other companies?

O'Brien: There are several reasons, but the most important one is that when you're a defense contractor, advertising is not an allowable cost of doing business with the government. Which means every penny we spend on an ad must come out of profit.

We've done a good job of advertising where we had to advertise. Our F-14 campaign was well advertised in Washington. If you were a senator who was going to vote, when you got up in the morning and turned on your TV to catch the news, the first thing you saw was a Tomcat, and the argument over why. It cost a lot of money, but it helped win the battle.

The Navy still needs EA-6B's. The Senate and the House agree the Navy needs more of them.

What will the development do to the real estate value in the area?

O'Brien: Well, it should raise the real estate value. It will reduce the taxes because it will pick up a large, large share of the school taxes, for example. It will not significantly increase the traffic in the area. The development will be primarily office space. There will be a hotel, not a motel. And there's a difference. So I think it will raise values significantly.

What incentive do I have to stay here, where you wait 18 months for a raise that is so minimal it's an insult to your intelligence?

O'Brien: I can't answer why you waited 18 months for a raise. There's no reason for you to

(Continued on Page 6)

Data Systems Moving Into Future With GQ

"We expect to have everyone in Data Systems through the GQ training program by June of 1990," says Tom McKessey, senior vice president-Information Services & Operations, Data Systems Division. He is the chairman of the division's GQ steering committee. "GQ is now being woven into the fabric of how we do business. It's helping us change for the better. And that process will accelerate once everyone's aboard."

Improving the overall efficiency and profitability of Data Systems has been a major goal from the outset.

"GQ is making us a more efficient and cost-effective organization," says McKessey. "Right now, a bit over 50 percent of our business comes from our internal accounts—the other Grumman divisions, such as Aircraft Systems, that use our services. By improving the jobs that we do, we will deliver those services at a lower cost, or we'll deliver more service at the same cost. So the entire Grumman organization will benefit."

McKessey says that when GQ's implementation was planned, seven business processes were identified that are critical to meeting customers' needs. One of them is procurement.

"We have four quality action teams looking at our procurement process," says McKessey. "All departments in Data Systems depend on Purchasing to obtain the equipment and supplies they need to do their jobs. All departments in Data Systems are involved in this critical process—starting with determining requirements through the eventual receipt and acceptance of the material or service.

"So improvements are being sought in all departments—not just Purchasing. Better requirements provided in a timely fashion will go a long way towards ensuring that the right product is delivered when required. This translates into improved cost and schedule performance on our contracts."

McKessey believes that GQ is already making Data Systems better and that customers will start seeing improvements by the spring. For example, the work of a quality action team led to the establishment of the consolidated help desk, which will go on line in January. "The buck will stop there: if the customer has a problem, the help desk will be the place where it gets resolved," says McKessey.

McKessey sees GQ as an essential component for future business success, too.

"A similar program helped revitalize Xerox in the face of intense Japanese competition," he says. "It's made Federal Express the more efficient operation it needed to become to stay number one. The evidence is in: Quality works."

Because Data Systems is more service-oriented than some of the other divisions, the swift implementation of GQ was more crucial.

"We're in daily contact with many of our customers. The president of Scandinavian Air Systems—SAS—once estimated that each of his customers interacted with seven or eight different employees every day," he continues. "He called those encounters '40,000 moments of truth,' because each one has the potential to sour the customer's perceptions. In Data Systems, we've got to become more aware of our moments of truth. We've got to make our customers' needs our imperatives by becoming more responsive and responsible."

Quality programs are taking hold inside the government as well as industry.

A quality action team is looking at the large issue of distributed information systems and how the division should be organized in today's computing environment. "The days of centralized data processing—the big mainframe walled away inside the computer room—are gone," says McKessey. "The mini- and micro-computer have changed the user community's support needs. Old organization structures don't adequately meet the new support requirements. A different approach is needed, and GQ will help provide it."

GQ will help Data Systems in future business endeavors, both with the government and within industry.

"Quality programs are taking hold inside the government as well as industry," says McKessey. "The Office of Management and Budget is the moving force—they've been empowered to audit quality action programs on the federal level. Government agencies are competing for recognition and awards. Anyone expecting to do business in this arena had better know how to play."

Members of the Data Systems' steering committee recently completed work on the first draft of a critical self-assessment that was based on the 193 evaluation elements for the Malcolm Baldridge Award—the most prestigious quality award in the country. "We judged ourselves against very rigorous criteria," says McKessey. "We know that we've got a lot of work to do, but we also discovered that we've got many elements of a quality organization in place right now."

We've got to make our customers' needs our imperatives by becoming more responsive and responsible.

GQ's success in Data Systems is tied to the first and second line managers, says McKessey. "GQ has to penetrate and be accepted by that level of management, and that's what we're working for.

"People on quality action teams are becoming more comfortable with their power to attack and fix major problems," he says.

"The steering committee's job is to keep up the pressure on the teams to reach conclusions so that change can occur quickly enough to generate faith in GQ," adds McKessey. "But we shouldn't forget that GQ is not a quick fix. It's a necessary and fundamental change in the way we conduct business now and into the future–it can't happen overnight."

Steering GQ. *Senior Vice President Tom McKessey is the chairman of the Data Systems' GQ steering committee. (Photo by Bob Settles)*

Band Hits The Road

The Grumman Band will bring holiday spirit to many Long Island sites with its annual Christmas Concert tour. All concerts begin at noon, except for Bldg. 1, which begins at 11:45 a.m.

Here's the schedule:

Monday, December 4 , Bldg. 106

Tuesday, December 5, Bldg. 30

Wednesday, December 6, Bldg. 35

Thursday, December 7, GHQ

Friday, December 8, Bldg. 3

Monday, December 11, Bldg. 1

Tuesday, December 12, Bldg. 6

Wednesday, December 13, Bldg. 43

Thursday, December 14, Bldg. 2

Friday, December 15, Bldg. 5

I Heard It At The Pin Meeting

(Continued from page 5)

wait 18 months for a raise if you're doing a job that deserves a raise. On the other hand, for you to get a raise, you've got to be giving us more product than you gave us a year ago.

It's just that you wait 18 months and your raise doesn't even go up with the standard of living.

O'Brien: That's a different issue and I don't want to debate that here. That's because I don't know whether you're a good worker or a bad worker or an average worker.

I do know that there are no rules that say you only get X percent and you have to wait Y months. I also said there's no automatic raise system anyplace in Grumman. And there shouldn't be. Unless all of us turn out more product, where are we going to get the money to pay for the raises? Now we may figure out what percentage of our total payroll we're going to spend every year on raises, but that doesn't equate to what percentage somebody can get. [*Grumman World* plans to do a story on raises early next year.]

When do you expect to close the runway and Building 1?

O'Brien: The runway will shut down late summer next year. That doesn't mean that Building 1 will close down simultaneously. It just means that we will stop flying in and out of there.

Pt. Mugu Ops Marks 20th Anniversary

Pt. Mugu Operations in California — which started out as a temporary field site — recently marked its 20th anniversary.

Grumman opened its facility here at the Pacific Missile Test Center in 1969 to support the brand-new F-14 Tomcat, which was first being developed and tested by Grumman and the Navy. The crew at Pt. Mugu now numbers about 362, the largest it has ever been. These Grummanites perform engineering, systems testing and integration, light manufacturing, and systems installation.

All the Grummmanites at Pt. Mugu attended an anniversary reception October 30 at the center's officers club.

"To many in the Navy, you are Grumman," said Vice Chairman Renso Caporali. "You have their trust, their confidence, their respect. Your relationship with the people who fly our planes is important to us."

"Because of your quality of effort and professionalism, Grumman has an excellent reputation with the Navy," said Aircraft Systems Division President Pete Oram.

"The center is the Naval Air Systems Command's West Coast field agency for all F-14 and EA-6B weapons system integration and software development,"said Charles Brown, vice president-Pt. Mugu Operations for Aircraft Systems. "We're here to support the Navy in that role. In addition, we get assignments from Bethpage."

Pt. Mugu Operations bids on business of its own, mostly for contracts of three years in duration. Even between full-scale development programs, the Navy constantly upgrades the software aboard aircraft in the fleet. This year, the team will do about $26.5 million in business.

The original Pt. Mugu crew of 57 was assigned to work on an 18-month program. The job: design and build the first F-14 systems integration test station; integrate the F-14's software into the plane; and demonstrate the system for the customer.

"After the job was finished, the Navy decided it didn't want to lose our capability," said Brown. "We're now the largest organization in the company that's located at a Navy base. The Navy people are right here to see how we operate — and that we deliver a quality product."

Besides the original F-14 systems integration test station, Pt. Mugu Operations built a test stand for the F-14A(PLUS), and an F-14D station is scheduled to go on line in 1990. The crew also designed and built two EA-6B test stations: for the Increased Capability-1 and -2 (ICAP-1 and ICAP-2) Prowlers. It is now designing a test station for the next generation Advanced Capability EA-6B, scheduled to join the fleet in 1992.

These test stands are made up of the actual electronic hardware and software aboard the aircraft. Computers feed them flight scenarios, enabling systems to be thoroughly checked out before flight. This step ensures safety and cuts down on costly flight time.

Pt. Mugu Operations is also involved in:

• Retrofitting F-14s with hardware upgrade kits. These installations have been done both at Pt. Mugu and at Miramar (California) and Oceana (Virginia) Naval Air Stations.

• Building and installing innovative components such as the F-14's chaff adapter. This device releases metal particles during a dogfight with an enemy aircraft. This creates "ghost" images on the enemy's radar, enabling the plane to escape detection.

• F-14 systems engineering, software integration and life-cycle planning. Life-cycle planning involves predicting what capabilities the plane will require at future intervals.

• Engineering support to Grumman Electronics Systems Division for the design and development of F-14D trainers.

The crew even provided technical support for a ride at a nearby amusement park, Six Flags Magic Mountain. The ride, Z-Force, is patterned after the F-14 and takes visitors on a looping ride that includes pulling three G's.

"We're quite a versatile crew here," said Brown, "and our presence at the Pacific Missile Test Center is an important asset to Grumman."

Grumman Beefs Up Its Evacuation Procedures

In the next few months, you may be asked to stop what you're doing and leave your building in a hurry.

Grumman is improving its emergency evacuation procedures for all its facilities nationwide, starting with Long Island. The improvements include: clearer exit signs and easier-to-understand exit route maps; a network of wardens in each building and department; and formal evacuation plans.

"This is part of ensuring employees a safe workplace — and that doesn't mean just manufacturing areas, but offices as well," says Art Gibson, staff assistant to the vice president - Product Integrity and Environmental Protection. "Federal and state authorities require emergency response capabilities but have been slow to mandate emergency evacuation programs. Our focus is to guarantee a safe workplace."

The single most important feature of the program is the evacuation drill. Grumman Headquarters and Building 12 are the only facilities that have had drills so far; Building 9 in Melville recently closed, but had such drills for years. More Long Island buildings will be having drills in the upcoming weeks. A team headed by Mike Leogrande, deputy director-Facility Operations, is putting together all the details.

In addition to the building manager and the wardens, a chief evacuation officer will be chosen for each facility. This person acts as a point of contact for firefighters and other emergency personnel. A command post is designated for each building, where the evacuation officer meets the fire chief or other outside official and explains the nature of the emergency.

"For instance, in Grumman Headquarters, the command post is the guard desk from which the public address system is controlled," says Gibson. "The post can be inside or outside the building.

"In some cases, we may only need to evacuate part of a large building," he adds. "People won't be asked to evacuate for no reason, but we will always err on the side of safety."

The building manager has the bulk of the responsibilities during an emergency, such as setting off alarms, notifying Security of emergency authorities to be called, and turning off electricity and other building systems.

Gibson describes the emergency wardens as "street cops." The aim is to have one warden for each 20 people in a department. They show people the way out of the building, lend assistance if needed, and check to make sure the area is vacated.

"People will know ahead of time that there will be a practice drill," says Gibson. "It's best to let people know it's a training drill. The aim is to get people out as quickly as possible."

The wardens will go through a brief orientation, and then go back and instruct the people in their areas on what to do when the alarm is sounded.

Department administrators have been asked to choose wardens. Furthermore, each warden will be assigned a backup in case he or she isn't around on the day of a drill or actual emergency.

The program ensures the proper evacuation of the handicapped. Leogrande's staff has provided the evacuation directive and guidelines to building managers.

Following these guidelines, they put together an evacuation plan customized to their specific facility. This plan is then submitted to the Corporate Safety Department for approval, prior to implementation.

Personals

I would like to express my sincere thanks to all my friends and co-workers for their kind expressions of sympathy during the sudden passing of my father. I would also like to thank all of those who contributed to the Joe Crecco Memorial Fund which supports needy kids from the St. Patrick's Youth Program. My brother Joe passed away in February with leukemia. **Arman Crecco**

My family and I would like to thank our friends at Grumman and extend our sincere appreciation for their kind expressions of support during the recent loss of my mother. **Karl Roman**

Joan and I wish to thank the Grumman family for their prayers and kind expressions of sympathy and support shown during the recent loss of our son Capt. James T. Bourne, USMC. **Jim Bourne**

The family of Martin Beltrami would like to thank all of his friends at Grumman for their support and kind expressions of sympathy during our loss. **Marty's wife Gerda and his brother Joe**

Hollywood Insider

Grummanites Help 'Flight of the Intruder' Get Off The Ground

Stephen Coonts' novel *Flight of the Intruder* spent 28 weeks on the *N.Y. Times* bestseller list. It's currently in production by Paramount Pictures, and promises to make an exciting motion picture, thanks in part to the help of some key people from the A-6 program, Corporate Instrumentation, Contracts and Public Affairs.

"Flight of the Intruder" tells the story of a Navy flier in Vietnam who's enraged by the death of his bombardier and by the meaninglessness of Navy bombing missions. He takes matters into his own hands and heads north to a Hanoi missile depot. Of course, he gets in trouble.

"It's kind of an adult 'Top Gun'," says Joe Ruggiero, an A-6 program manager. Ruggiero recently returned from the Hawaiian Island of Kauai, where he and Grummanites Vic Rutkowski and Ken Mortimer spent a week as technical consultants to Paramount setting up the crash and rescue scene that closes the movie.

Before beginning the big budget production, Paramount sought and received Navy approval and Grumman cooperation.

"Grumman has an excellent reputation in Hollywood because of the work we've done on 'The Final Countdown' and 'Top Gun'," says Dick Milligan of the Public Affairs department.

To provide the realism that director John Milius, whose work includes "Apocalypse Now," wanted, Corporate Instrumentation, under contract to Paramount, designed special camera mounts for the A-6's vertical fin and for its wing pylons. Also, a mount was designed for over-the-shoulder shots inside the cockpit.

"After designing the exterior mounts, stress and aerodynamics analyses were performed to make sure they posed no danger to the aircraft," says Gene Goltz, director of Corporate Instrumentation. "The modifications and analysis data were then reviewed and approved by the Navy."

John Gilbert, lead engineer in Corporate Instrumentation, was the task team leader of a group of technicians from the Whidbey Island Naval Air Station, Washington, which installed the mounts. Gilbert is currently in San Diego at the Naval Air Station Miramar on assignment to Paramount for the filming of the aircraft carrier sequences.

"The airborne shots will be spectacular," says Milligan.

Realism in the crash scene was also a high priority. The boneyards at Bethpage, Calverton and St. Augustine were combed for the necessary parts. Ruggiero prepared a two-inch-thick bill of material that detailed each part number to be used and supervised their shipment to Paramount.

"We shipped a nearly complete A-6, but Paramount couldn't put the puzzle together when they set up the crash scene on Kauai," says Ruggiero. After an urgent call to Grumman, Rutkowski, an A-6 assembly expert from Calverton, and Mortimer, a foreman on the A-6 program out of St. Augustine, flew to Hawaii. Ruggiero joined them two days later.

Although they got some time off for sightseeing, the Grummanites were on no vacation. Instead, teamed with a Paramount construction crew, they worked 12- to 14-hour days assembling the A-6 with none of the hoisting, joining, and aligning tools and work platforms available in the shop.

"We did have a crane and we improvised a lot," says Mortimer. "But Kauai is the wettest spot on earth—it rained in torrents every day around noon. That made moving the crane a problem, because it would sink into the mud. Paramount had to bring in a bulldozer and truckloads of gravel just to reposition it. Fortunately, everyone got along fine."

The finished the job ahead of schedule. "Paramount was very pleased with the job we did," says Ruggiero. "We made the scene more authentic by using a real A-6 and setting the aircraft's control surfaces in a crash landing condition. This created a dramatic and realistic look that really pleased the art director. I told him that Grumman had pulled planes out of the jungle before, but to the best of my knowledge, this was the first time we'd built one there."

"Flight of the Intruder" is scheduled for release next July.

Lights, Camera, Action. *Grummanites (L to R) Ken Mortimer, Vic Rutkowski and Joe Ruggiero helped construct an A-6 Intruder crash during filming of Paramount's 'Flight of the Intruder.'*

Turkey Distribution On Dec. 21; Full Work Day Slated For Dec. 22

Turkeys will be distributed at all Long Island buildings at the end of the work day on Thursday, December 21. Turkey tickets will be distributed with the paychecks that day.

There will be no turkeys available on Friday, December 22. However, all Grumman plants are open for business that Friday.

"Please remember that all Grummanites are required to work their full normal shift on both Thursday and Friday of that week," says Grumman Vice President and Secretary Bob Bradshaw. "People who have remaining vacation time and wish to take off that Friday are welcome to do so — if the workload permits."

Arrangements should be made by each department to deliver turkeys to the homes of Grummanites on medical leave. If delivery can't be made by someone from the department, arrangements should be made with Gerry McMahon, manager of Employee Services, 575-6232, by December 1.

Let's Talk Turkey

Would you like a kosher turkey for your family instead of the non-kosher Grumman turkey? You can have one.

Don't pick up a Grumman turkey at the usual distribution time. Instead, buy a kosher turkey are the store of your choice. Then, if you live on Long Island, bring your 1989 Grumman turkey ticket and the receipt from your kosher turkey to any Employee Services office in Bethpage, Calverton, Great River or Melville before January 31, 1990. Employee Services will contact you when your reimbursement check for up to $16 is ready for pick-up.

The reimbursement will be handled locally for Grummanites at other sites across the country. Contact your administrator for details.

Donate A Turkey

If you'd like to donate your holiday turkey to a worthy organization or needy family, just send your turkey ticket to Sharon Grosser, A33-GHQ.

Need Help With Your Turkey?

The Corporate Equal Employment Opportunity Department will help disabled or handicapped Grummanites pick up their turkeys on December 14, from 8 a.m. to 2 p.m. at Food Services in Building 2.

Supervisors should send a list of names and the turkey tickets to Bart Brophy, D03-GHQ, Corporate Equal Employment Opportunity Department. This list must reach Brophy before December 14.

For more information contact Lillian DuBois, 346-8075, or Floyd Cisco, 575-1856.

Ever Watchful. *Senior air traffic controller Ron Caruso and tower supervisor Gail Work at work inside the cab of the Calverton flight control tower. All Grumman air traffic controllers are FAA-certified.*

Tower Watches Over Calverton Airspace

CALVERTON, N.Y., November 10 — It may not be as hectic as JFK's flight control tower, but Grumman's four air traffic controllers in Calverton take their jobs just as seriously as controllers at any major airport. Calverton is where Grumman tests its aircraft before turning them over to the customer. The Calverton airport is run in strict compliance with Federal Aviation Administration rules and regulations, and all of the controllers are FAA-certified.

"We flight test only in good weather, like today," says Gail Work, control tower supervisor, scanning the airfield with binoculars from behind the tower's console. "It can be quiet for an hour or two and suddenly get very busy. That's what we're prepared for."

Between five and 10 test flights will occur on a typical test day. Tower activity can become intense very quickly when you add in unscheduled arrivals and departures and handling aircraft clearances over the Calverton airspace. The tower's regular operating hours are 8 a.m. to 4:30 p.m., weekdays, but they are extended as required to accommodate the flight test schedule.

The view from the glass-walled cab at the top of the seven story tower is panoramic. Lined up on the tarmac below are three F-14s, two EA-6B's and an Army A-10, all being attended to by flight crews.

While Work monitors airport activity with binoculars, controller Ron Caruso clears three National Guard helicopters over Calverton's airspace. According to FAA regulations, nobody's allowed into the airspace without tower permission. But "flyovers"—planes that venture into the airspace without seeking clearance—are an occasional occurrence and an ever-present danger. "Unfortunately, there isn't much that can be done to catch and punish flyovers," says Work. "Our best defense is to know they're there so that we can alert our flight crews."

A few moments later, the helicopters appear low in the distance and quickly disappear into the background of trees that cover much of Calverton's 7,500 acres. Caruso then clears two F-14A (PLUS) aircraft for takeoff. One after the other, they depart with a deep roar. The glow of their engines quickly shrinks to distant dots. "If a Cessna had wandered into the flight path, well there wouldn't be much time to avoid it," says Caruso.

Shortly after the F14s are out of sight, a nearby E-2C Hawkeye radios the tower for permission to perform a series of "touch and goes"—a test maneuver that involves touching the plane's wheels to the runway and going immediately airborne. Caruso clears the plane, and the Hawkeye soon appears out of the west at about 1,000 feet. It passes halfway down runway 14, and circles back to begin the series.

As the Hawkeye sends little puffs of smoke off the runway every few minutes, the controllers go about their daily routines. They continuously scan their airspace and follow conversations from console speakers—they monitor all of Calverton's radio communications. They answer phones and update flight test information on a Datapoint computer, which feeds it automatically to Flight Test, Flight Operations and the Identification Friend or Foe (IFF) radar tracking station two floors below the cab. Every hour they check the weather; all are certified National Weather Service observers.

Roll Out. *An F-14 rolls past the Calverton flight control tower. Grumman's air traffic controllers work in the cab on top of the seven-story tower. The tower also houses the radio communications lab and the IFF tracking station. (Photo by Gerry Costello)*

Most testing is performed over the Atlantic, in a Navy-controlled block of airspace 35 miles southeast of Calverton. It's been set aside by the government for flight testing. Grumman flights in this zone are monitored by the tower's IFF tracking equipment, which was installed last year.

"The new system lets us zero in on a test zone and at the same time monitor airspace from the Patuxent Naval Air Station in Maryland to the Canadian border," says Gerry Wiss, chief air traffic controller. "With the IFF station, we can keep an eye on our planes to make sure they don't get into trouble." A helicopter is always ready for dispatch should a plane develop problems while over water; its last pickup was in 1981.

The IFF station advises but does not control Grumman aircraft—the Navy is the controlling authority in the test zone. With the previous equipment, controllers had to hand-plot aircraft positions. Now, mapping and plotting are automatic. "It gives pilots a secure feeling knowing that the tracker is watching over them," says Pete Tummillo, director of Flight Operations.

The controllers' vigilance has paid off in an outstanding safety record. In fact, Wiss and Work, who have more than 40 years' experience between them, could only recall one near-miss incident. "That was 10 or 15 years ago," says Work. "It was summer and the weather was severe. Everything was fogged in, too. Testing was canceled, of course. A BOAC 747 that had been turned away at New York and Philadelphia and was coming here as a last resort. It was running low on fuel.

"It broke out of the fog about a quarter mile away and was heading straight for the tower. It felt like I could touch it. I said, 'To your left, sir,' and the pilot made a quick adjustment. He landed with a planeload of airsick passengers."

The F-14s that departed earlier now request permission to land. Work clears one, and then the next. Each passes over the tower as if in salute, banking heavily into a 180 degree turn. Both touch down perfectly and taxi to their waiting crews.

O. Alter

J.J. Amentler

L. Andersen

G. R. Autler

S. J. Axel

R. S. Barbagallo

E. Beyer

M. R. Buxton

R. D. Cameron

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A. Catanzaro

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H. Kasten

R. G. Kerr

A. Kirillin

M. Kogan

C. R. Kohler

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M. J. LaTorre

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Donald A. McClughan, Bethpage, Space Systems

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Roger B. Kendall, Bethpage, Aircraft Systems
Frank Koch II, Bethpage, Data Systems
Stanley G. Misiewicz, Calverton, Aircraft Systems
Franz H. Paehr, Bethpage, Aircraft Systems

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John A. Adornato, Melville, Aircraft Systems
Fritz Blomback, Bethpage, Aircraft Systems
Ernest J. Eichler, Bethpage, Aircraft Systems

Grumman World — Vol. 8, No. 22, November 27, 1989. Published twice a month for active and retired employees of Grumman Corporation. 1111 Stewart Ave., Bethpage, N.Y. 11714. W.B. Jones, Vice President-Public Affairs.

Norine Lyons
Director - Corporate Publications
575-3720

Kathleen Housley
Editor — 575-3293

Associate Editors
Chuck Martin — 575-8999
Bob Sample — 575-5118
John Vosilla — 575-5119

Bernadette Gately
Editorial Assistant — 575-4334

FAX number: (516) 346-9614

E. Lastorino

R. M. Llinares

J. J. Martines

J. K. McAfee Jr.

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A. G. Noveck

C. S. Oppegard

H. C. Pabst Jr.

R. F. Penn

D. A. Perkins

D. R. Pippin

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L. D. Trupia

J. D. Usrey

T. J. Vogt

P. A. Wagner

T. W. Wagner

J. H. Wernert

J. G. Whelan

E. H. Wilenski

L. Yeswoit

Volunteers Are Needed

A lot of Grumman people volunteer their services — from firefighting to visiting homebound seniors. In upcoming issues, *Grumman World* will highlight the efforts of some of those individuals. It will also list agencies and groups that need volunteers. Some of the work is short-term, just for a weekend, while other positions are for a longer duration.

Here are some non-profit groups that need volunteers:

The Long Island Chapter of the American Diabetes Association is looking for volunteers to coordinate the Christmas parties for the Children's Clubs of the association. Call (516) 752-1752.

WLIW needs volunteers for its on-air "Great Holiday Auction," December 1-10 from 8:30 p.m. to midnight. Supper will be included. Call Dotty, (516) 454-8866.

Glen Oaks Volunteer Ambulance Corps needs crew chiefs, attendants, drivers and dispatchers. Training is provided. Call (718) 347-1637.

Nassau County Chapter of the American Red Cross needs drivers to take people to medical appointments and to supermarkets. A van driver is also needed to pick up senior citizens for a weekly trip to the grocery store. Others are needed to help supervise children on Wednesdays from 9:30 a.m. to 12:30 p.m. in the Red Cross Nursery in the Family Court in Westbury. There are many other volunteer opportunities. Call Betty Campbell, Office of Volunteers, (516) 747-3500, Ext. 218.

What About My Group?

If you volunteer for a group that needs more people like yourself, drop us a line. To make sure that only legitimate, non-profit groups are listed, all agencies and groups must be approved through the Grumman Employee Contributions Office, (516) 575-3254. Groups and individuals can also write to: Grumman World—Volunteers, Grumman Corporation, A22-GHQ, Bethpage, N.Y. 11714. We'll pass the information to the Employee Contributions Office for approval. Don't hesitate to enlist this service if your volunteer group is located off Long Island. All Grumman sites are invited to participate. For more information, call Grumman World, (516) 575-3293.

Readership Survey

We don't want to do all the talking. We'd like to know what you think about the things you see in these pages. Your comments, suggestions and complaints are welcomed. Please take a few minutes and give us your opinions.

Article	Great	Good	Poor	Didn't Read
International (P. 1)	[ ]	[ ]	[ ]	[ ]
C-17 (P. 3)	[ ]	[ ]	[ ]	[ ]
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GQ in Data Systems (P. 6)	[ ]	[ ]	[ ]	[ ]

Suggestions for future articles:.....
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Division.....
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Service Milestones

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Harley Nelsen Jr., Bethpage, Aircraft Systems
Alan G. Nichol, Bethpage, Corporate Services
Clifford S. Oppegard, Bethpage, Corporate Services
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Edward V. Ramirez, Bethpage, Space Systems
Joseph Reese, Bethpage, Aircraft Systems
Ivar E. Ringdahl, Pt. Mugu, Aircraft Systems
Ronald A. Ruotolo, Melville, Electronics Systems
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James K. Ryan, Calverton, Aircraft Systems
Frank S. Scheibl, Bethpage, Aircraft Systems
Marianne Schiralli, Bethpage, Corporate Services
Charles A. Schlener, Holtsville, Data Systems
Robert F. Shannon, Bethpage, Aircraft Systems
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William T. Swensen, Bethpage, Aircraft Systems
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Thomas W. Wagner, Calverton, Aircraft Systems
James H. Wernert, Bethpage, Aircraft Systems
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James J. Amentler, Bethpage, Aircraft Systems
Laurence Andersen, Melbourne, Melbourne Systems
Richard S. Barbagallo, Melville, Aircraft Systems
Walter A. Barron, Bethpage, Aircraft Systems
Edward Beyer, Bethpage, Aircraft Systems
Margaret R. Buxton, Bethpage, Aircraft Systems
Robert D. Cameron, Calverton, Aircraft Systems
William Carter, Bethpage, Aircraft Systems
Anthony Catanzaro, Melville, Aircraft Systems
John Cattonar Jr., Bethpage, Aircraft Systems
Joseph J. Codispoti, Bethpage, Corporate Services
Raul Conde, Bethpage, Aircraft Systems
Richard Donovan, Bethpage, Aircraft Systems
John B. Doroski, Calverton, Aircraft Systems
Leslie L. Elliott, Bethpage, Aircraft Systems
Stanley J. Ferraiolo, Bethpage, Aircraft Systems
Richard H. Ferry, Calverton, Aircraft Systems
Leo Fisco Jr., Holtsville, Data Systems
Charles F. Fish, Great River, Electronics Systems
Daniel M. Goldberg, Calverton, Aircraft Systems
Fred T. Greene, Hicksville, Corporate Services
Kenneth E. Greenspun, China Lake, Aircraft Systems
Gregory Grubelich, Melville, Aircraft Systems
John J. Hassett, Bethpage, Aircraft Systems
Frederick O. Heald, Melville, Aircraft Systems
George J. Homfeld, Bethpage, Aircraft Systems
Paul J. Horwat, Calverton, Aircraft Systems
Frank Incerto, Bethpage, Aircraft Systems
Joseph P. Kaltenback, Bethpage, Aircraft Systems
Ronald G. Kerr, Bethpage, Aircraft Systems
Mike Kogan, Reston, Space Station Program Support
Giacinto Lanfranco, Bethpage, Aircraft Systems
Eugene Lastorino, Melville, Aircraft Systems
Richard M. Llinares, Bethpage, Aircraft Systems
David M. MacIntosh, Calverton, Aircraft Systems
Joseph J. Martines, Bethpage, Aircraft Systems
Leonard P. McDonough, Bethpage, Space Systems
Robert Merle, Bethpage, Aircraft Systems
John E. Murman, Bethpage, Aircraft Systems
Arthur G. Noveck, Calverton, Aircraft Systems
Harold C. Pabst Jr., Bethpage, Aircraft Systems
Raymond F. Penn, Melbourne, Melbourne Systems
Daniel A. Perkins, Melville, Aircraft Systems
Daniel R. Pippin, Glen Arm, Aircraft Systems
James W. Prassos, Calverton, Data Systems
John A. Protopapas, Bethpage, Aircraft Systems
John W. Rockensies, Bethpage, Aircraft Systems
John A. Romanski, Calverton, Aircraft Systems
Homer Ryles, Bethpage, Aircraft Systems
Raymond N. Saulter, Bethpage, Aircraft Systems
Edward L. Schrama, Calverton, Aircraft Systems
Jerome Sherer, Bethpage, Aircraft Systems
Dean R. Shull, Bethpage, Aircraft Systems
Doris L. Steinhauer, Melville, Aircraft Systems
Charles R. Stumpf, Bethpage, Aircraft Systems
Earl T. Theodorsen, Bethpage, Aircraft Systems
Homer Thompson, Stuart, Aircraft Systems
Ronald B. Tredy, San Diego, Aircraft Systems
Luis D. Trupia, Bethpage, Aircraft Systems
Thomas J. Vogt, Calverton, Aircraft Systems
Paul A. Wagner, Bethpage, Aircraft Systems
James G. Whelan, Melbourne, Melbourne Systems
Leilani Yeswoit, Bethpage, Space Systems